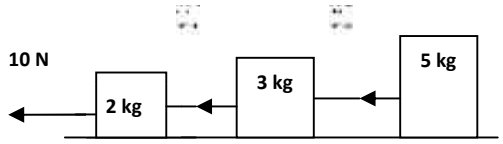
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GGSIPU Physics 2004

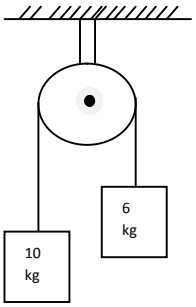
1. Three blocks of masses 2 kg,3 kg and 5 kg are connected to each other with light string and are then placed on a frictionless surface as shown in the figure.The system is pulled by a force F=10 N,then tension T_1 is :



(a) 1 N (b) 5 N

(c) 8 N (d) 10 N

2. Two masses m_1 and m_2 are attached to a string which passes over a frictionless smooth pulley.When m_1 = 10 kg, m_2=6 kg,the acceleration of masses is :



(a) 20 m/s^2 (b) 5 m/s^2

(c) 2.5 m/s^2 (d) 10 m/s^2

3. An object is moving through the liquid.The viscous damping force acting on it is proportional to the velocity.Then dimension of constant of proportionality is :

(a) $[ML^{-1}T^{-1}]$ (b) $[MLT^{-1}]$

(c) $[M^0LT^{-1}]$ (d) $[ML^0T^{-1}]$

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4. Magnetic meridian is a :

(a) Point (b) horizontal plane

(c) Vertical plane (d) Line along N-S

5. The unit of L/R is (where L = inductance and R = resistance) :

(a) Sec (b) sec^{-1}

(c) volt (d) ampere

6. If the current is doubled ,the deflection is also doubled in :

(a) a tengent galvanometer (b) a moving coil galvanometer

(c) both (a) and (b) (d) none of the above

7. The permeability of a paramagnetic substance is :

(a) Slightly more than vaccum (b) slightly less than vaccum

(c) much more than vaccum (d) none of the above

8. When particles will have minimum frequency of revolution when projected with the same velocity perpendicular to magnetic field?

(a) Li^+ (b) Electron

(c) Porton (d) He^2

9. A body of mass M_1 collides elastically with another mass M_2 at rest.There is maximum transfer of energy when :

(a) $M_{2>M_1}$ (b) $M_{1<M_2}$

(c) $M_{1=M_2}$ (d) same of all values of $M_{1 and M_2}$

10. Minimum energy required to fake out the only one electron from ground state of He^+ is :

(a) 13.6 eV (b) 54.4 eV

(c) 27.2 eV (d) 6.8 eV

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11. Photons of 5.5 eV energy fall on the surface of the metal emitting photoclectrons of maximum kinetic energy 4.0 eV .The stopping voltage required for these electrons is :

(a) 5.5 V (b) 1.5 V

(c) 9.5 V (d) 4.0 V

12. Which is different from others by units?

(a) Phase different (b) Mechanical equivalent

(c) Loudness of sound (d) poission's ratio

13. The velocity of a body of rest mass m_o is $\frac{\sqrt{3}}{2}c$ (where c is the velocity of light in vaccum). Then mass of this body is :

(a) $(\sqrt{3}/2)m_o$ (b) $(½)m_o$

(c) $2m_o$ (d) $(2/\sqrt{3})m_o$

14. A ball is droped from top of a tower of 100m height.Simultaneously another ball was thrown upward from buttom of the tower with a speed of 50 m/s.They will cross each other after : ($g = 10\ m/s^2$)

(a) 1 sec (b) 2 sec

(c) 3 sec (d) 4 sec

15. The driver of a car moving towards a rocket launching pad with a speed of 6 m/s observes that the rocket is moving with speed of 10 m/s .The upward speed of the rocket as seen by the stationary observer is :

(a) 4 m/s (b) 6 m/s

(c) 8 m/s (d) 11 m/s

16. A satellite revolves very near to the earth surface. Its speed should be around :

(a) 5 km/s (b) 8 km/s

(c) 2 km/s (d) 11 km/s

17. If the density of the earth is doubled keeping its radious constant,then acclearation due to gravity g is :

(a) $20\ m/s^2$ (b) $10\ m/s^2$

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(c) 5 m/s^2 (d) 2.5 m/s^2

18. A simple pendulum oscillates in a vertical plane.When it passes through the mean position,the tension in the string is 3 times the weight of the pendulum bob.What is the maximum displacement of the pendulum of the string with respect to the vertical ?

(a) 30^0 (b) 45^0

(c) 60^0 (d) 90^0

19. A body is massed 8kg is moved by a force F=3 x N,where x is the distance covered.Initial position is x=2 m and the final position is x=10 m.The initial speed is zero.The final speed is :

(a) 6 m/s (b) 12 m/s

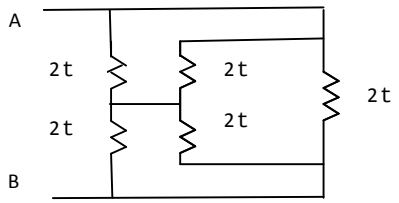
(c) 18 m/s (d) 14 m/s

20. Which of the following statement is true ?

(a) velocity of light is constant in all media. (b) Velocity of light in vaccum is maximum

(c) Velocity of light is same in all reference frame (d) laws of nature have identical from in all reference frames.

21. Find the equivalent resistance across AB:



(a) 1 t (b) 2 t

(c) 3 t (d) 4 t

22. The nuclear reaction $1H^1 + 1H^1 \longrightarrow 2He^4$ (mass of deuteron = 2.0141 amu and of He = 4.0024 amu) is :

(a) fusion reaction releasing 24 MeV energy

(b) fusion reaction absorbing 24 MeV energy

(c) fission reaction releasing 0.0258 MeV energy

(d) fission reaction absorbing 0.0258 MeV enegy

23. In Thomson experiment of finding e/m for electrons,beam of electron is replaced by that of mouns (particle with same charge as of electrons but mass 208 times that of electrons). No deflection condition in this case satisfy if :

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(a) B is increasssed to 208 times (b) E is increased to 208 times

(c) B is increased to 14.4 times (d) none of the above

24. A thin metal plate P is inserted half way between the plates of a parallel plate capacitor of capacitance C in such a way that it is parallel of the two plates.The capacitance now becomes :

(a) C (b) $\frac{C}{2}$

(c) 4c (d) none of these

25. An inclined plane makes an angle 30^0 with horizontal .A solid sphere rolling down this inclined plane has a linear acceleration of :

(a) $\frac{5g}{14}$ (b) $\frac{2g}{3}$

(c) $\frac{g}{3}$ (d) $\frac{5g}{7}$

26. A bullet of mass 10 g is fired from a gun of mass 1 kg.If the recoil velocity vis 5 m/s,the velocity of the muzzle is :

(a) 0.05 m/s (b) 5 m/s

(c) 50 m/s (d) 500 m/s

27. A partiqular moves with constant speed 3 along circular path of radius r and completes the circle in time T. The acceleration of the particle is :

(a) $\frac{2\pi^3}{T}$ (b) $\frac{2\pi r}{T}$

(c) $\frac{2\pi r^2}{T}$ (d) $\frac{2\pi r^2}{T}$

28. The separation between C and O atoms in co is 1.2 Å.The distance of carbon atom from the centre of mass is :

(a) 0.3 Å (b) 0.7 Å

(C) 0.5 Å (d) 0.9 Å

29. A body moves a distance of 10 m under the action of force F = 10 N.if the work is done by 25 j,the angle which the force makes with the direction of motion is :

(a) 0^0 (b) 30^0

(c) 60^0 (d) none of these

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30. When a spring is stretched by 2 cm,it stores 100 j of energy .If it is stretched further by 2 cm,the stored energy will be increased by :

(a) 100 j (b) 200 j

(c) 300 j (d) 400 j

31. Two wires A and B are of same materials.Their lengths are in the ratio 1:2 and diameters are in the ratio 2:1 .When stretched by force F_A and F_B respectively they got equal increase in their lengths.

Then the ratio $\frac{F_A}{F_B}$ should be :

(a) 1:2 (b) 1:1

(c) 2:1 (d) 8:1

32. Mixed He^+ and O^{2+} ions (mass of He^+ = 4 amu and that of O^{2+} =16 amu)beam passes a region of constant perpendicular magnetic field .If kinetic energy of all the ions is same then :

(a) He^+ ions will be deflected more than those of O^{2+}

(b) He^+ ions will be deflected less than those of O^{2+}

(c) all the ions will be deflected equally

(d) no ions will be deflected

33. In young double slit experiment the wavelength of light was changed from 7000 Å to 3500 Å .While doubling the separation between the slits which of the following is not true for the experiment ?

(a) The width of the fringes changes

(b) The colour of bright fringes changes

(c) The separation between successive bright fringes changes

(d) The separation between successive dark fringes remains unchanged

34. The coherence of two light sources means that the light waves emitted have :

(a) same frequency (b) same intensity

(c) constant phase difference (d) same velocity

35. The valence band and conduction band of a solid overlap at low temperature,the solid may be :

(a) a metal (b) a semiconductor

(c) an insultor (d) none of these

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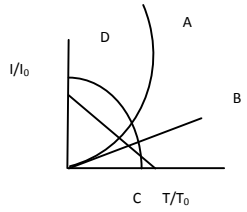
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36. The dominant contribution to current comes from holes in case of :

(a) metals (b) intrinsic semiconductor

(c) p-type extrinsic semiconductors (d) n-type extrinsic semiconductors

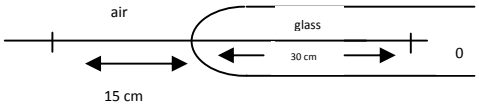
37. The ratio of theromionic currents (I/I_0) for a metal when the temperature is slowly increased T_0 to T as shown in figure.(I and I_0 are currents at T and T_0 respectively).Then which one is correct?



(a) A (b) B

(c) C (d) D

38. A point object 0 is placed in front of a glass rod having spherical end of radius of curvature 30 cm.The image would be formed at :



(a) 30 cm left (b) infinity

(c) 1 cm to the right (d) 18 cm to the left

39. In the information of a rainbow light from the sun on water droplets undergoes :

(a) dispersion only (b) only total internal reflection

(c) dispersion and total internal reflectioin (d) none of the above

40. The angular mafnification of a simle microscope can be increased by increasing :

(a) focal length of lens (b) size of object

(d) aperture of lens (d) power of lens

41. If no external voltage is applied across p-n junction,there would be :

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(a) no electric field across the junction

(b) an electric field pointing from n-type to p-type side across the junction

(c) an electric field pointing from p-type to n-type side across the junction

(d) a temporary electric field during formation of p-n junction that would subssequenly disappear

42. Light travelling from a transparent medium to air undergoes total internal reflection at an angle of incidence of 45^0 .Then refractive index of the medium may be :

(a) 1.5 (b) 1.3

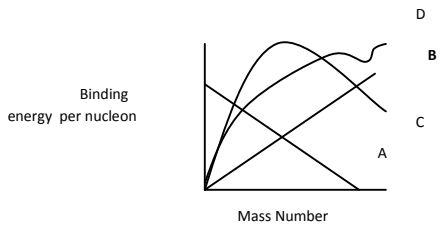
(c) 1.1 (d) $1\sqrt{2}$

43. Plate voltage of a triode is increased from 200 V to 225 V. To maintain the plate current,change in gride voltage from 5 V to 5.75 V is needed.the amplification factor is :

(a) 40 (b) 45

(c) 33.3 (d) 25

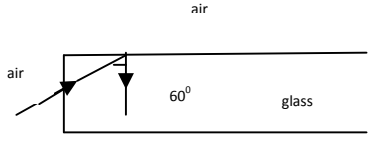
44. Binding energy per nucleon plot against the mass number for stable nuclei is shown in the figure.Which curve is correct ?



(a) A (b) B

(c) C (d) D

45. A light ray from air is incident (as shown in figure) at one end of a glass fiber (refractive index, « = 1.5) making an incidence angle of 60^0 on the leteral surface,so that it undergoes a total internal reflection .How much time would it take to traverse the straight fiber of length 1 km?



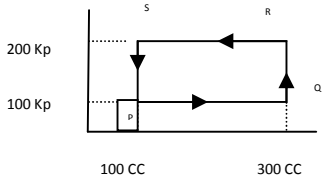
(a) 3.33 «s (b) 6.67 «s

(c) 5.77 «s (d) 3.85 «s

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46. A thermodynamic system is taken through the cycle PQRSP process.The network done by the system is :

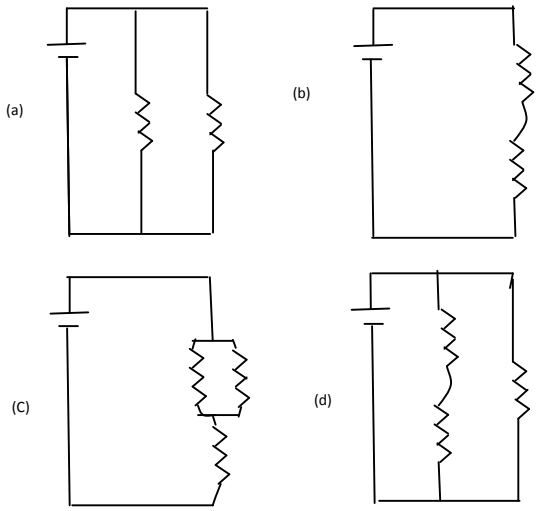


(a) 20 J (b) -20 J

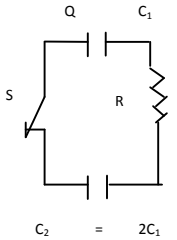
(c) 400 J (d) -374 J

47. Consider four circuits shown in the figure below .In which circuit dissipated is greatest ?

(Neglect the internal resistance of the power supply)



48. Two capacitors C_1 and $C_2 = 2\ C_1$ are connected in a circuit with a switch between them as shown in the figure.Initially the switch is open and C_1 holds charge Q.The switched is closed.At steady state,the charge on each capacitors will be :



49. A particle is moving in a vertical circle.The tensions in the string when passing through two positions at angles 30^0 and 60^0 from vertical (lowest positions) are T_1 and T_2 respectively then :

(a) $T_1 = T_2$ (b) $T_2 > T_1$

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(c) $T_1>T_2$ (d) tension in the string always remains the same

50. A coil of 100 turns carries a current of 5 mA and creates a magnetic flux of 10^{-5} weber.The inductance is :

(a) 0.2 mH (b) 2.0 mH

(c) 0.02 mH (d) none of these

51. The starter motor of a car draw a current I = 300 A from the battery of voltage 12 V.If the car starts only after 2 minutes,what is the energy drawn from the battery ?

(a) 3 kJ (b) 30 kJ

(c) 7.2 kJ (d) 432 kJ

52. Surface of the lake is at 2^0C and depth of the lake is 20 m.Find the temperature of the buttom of the lake :

(a) 2^0C (b) 3^0C

(c) 4^0C (d) none of these

53. $y_1 = 4 \sin (\mu t + kx), y_2 = -4 \cos (\mu t + kx)$,the phase difference is :

(a) ®/2 (b) 3®/2

(c) ® (d) zero

54. gauss's law should be invalid if :

(a) there were magnetic monopoles

(b) the inverse square law were no exactly true

(c) the velocity of light were not a universal constant

(d) none of the above

55. A changed particle of mass 0.003g is held stationary in space by placing by placing by it in a downward direction of electric field of $6x10^4$ N/C. Then the magnitude of the charge is :

(a) $5x10^{-4}$ C (b) $5x10^{-10}$ C

(c) $-18x10^{-6}$ C (d) $-5x10^{-9}$ C

56. A parallel plate capacitor has an electric field of 10^5 V/m between the plates .If the charge on the capacitor plate is 1 «C,the force on each capacitor plate is :

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(a) 0.5 N (b) 0.05 N

(c) 0.005 N (d) none of these

57. An elementary of particle of mass m and charge +e is projected with velocity ¬ at a much more massive particle of charge Ze,where Z>0.What is the closed possible approach of the incident particle?

(a) $Ze^2/4®£_0m^{3\,2}$ (b) $Ze^2/4®£_0r_n$

(c) $Ze^{2/}8®£_0r_n$ (d) $-Ze^2/8®£_0r_n$

58. 1 g of water atmospheric pressure has volume of 1 cc and when boiled it become 1681 cc of steam.The heat of vaporization of water is 540 cal/g.Then the changes in its internal energy in this process is :

(a) 540 cal (b) 500 cal

(c) 1681 cal (d) none of these

59. a physicist works in a laboratory where the magnetic field is 2 T. She wears a necklace enclosing area 0.01 m^2 in such a way that the plane of the necklace is normal to the field and is having a resistance R = 0.01 t .Beacause of power failure,the fields decays to 1 T in time 10^{-3} sec. Then what is the total heat produced in her necklace?

(a) 10 J (b) 20 J

(c) 20 J (d) 40 J

60. The temperature coefficient of resistance of a wire is $0.00125^0\ C^{-1}$.At 300 K,resistance is 1 t .At what temperature the resistance of the wire will be 2 t ?

(a) 800 K (b) 1100 K

(c) 600 K (d) none of these

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